



## MOSQUITO BIOLOGY

## EDUCATIONAL OUTREACH

Mosquito control programs need the support of an informed public, so community outreach will continue to be an important part of the 2018 program.

Educational presentations are designed to raise awareness of mosquito habitats and life cycles. Each season homeowners are reminded of ways to reduce backyard larval breeding. Presentations are given to community service groups and local government officials, while flyers, brochures, door hangers, bookmarks, and rack cards are hand-distributed or mailed to county residents and visitors. Media will be utilized for press releases on important activities, events, and disease updates.

Elementary educational programs will shift focus in 2018 as Mosquito Control works with the Bay City Public School District as a First Grade "Life Cycle" STEM partner.



## BIOLOGY DEPARTMENT

Surveillance for immature and adult mosquitoes and the diseases they may transmit is part of the Biology Department's daily operations. Larvae are sampled in woodlots, fields, ditches, pools, sewage lagoons, catch basins, and retention ponds while adults are collected from mechanical traps. These traps include New Jersey Light Traps, CDC Traps, and Gravid Traps. Data are collected and analyzed in order to control mosquitoes in the most effective way and reduce disease transmission while minimizing environmental impacts. A series of rain gauges will also be monitored to determine where likely larval production is occurring and to decide where to dispatch crews.

Monitoring of mosquito-transmitted diseases will continue for 2018 through processing/testing of adult mosquitoes and dead birds for the presence of West Nile Virus (WNV), St. Louis (SLE), and Eastern Equine encephalitis (EEE) viruses. *Culex* species are important for the amplification and transmission of WNV and SLE virus in Michigan and *Coquillettidia perturbans*, the cattail marsh mosquito, is an important vector of EEE. Staff will keep abreast, through the CDC, of Zika and Chikungunya virus activity. Currently, the vectors for these diseases, *Aedes aegypti* and *Aedes albopictus* have not been found in the Great Lakes Bay Region.

Larval surveillance is important in determining the abundance of mosquito larvae in various habitats. The information can be used to determine optimal times for using larval control materials and to determine the need and timing for adult mosquito control. Crews collect larval samples daily that are identified by lab staff. Larvae are identified to the species level by using a dichotomous key and dissecting scope.

# Bay County Mosquito Control

A DIVISION OF BAY COUNTY  
ENVIRONMENTAL AFFAIRS & COMMUNITY DEVELOPMENT



## SPRING MOSQUITO LARVAL CAMPAIGN THE THREE KEYS TO SUCCESS

- 1 Surveillance** of mosquito larval populations using pre- and post-treatment dip counts is conducted in 40 woodlots to monitor product efficacy. Staff also conduct quality control checks of treated woodlots watching for product placement and dosage rates.
- 2 Calibration** involves gathering granules dispensed from aircraft to determine swath width and accurate application dosage rate.
- 3 Bti Larvicide** kills mosquito larvae, but does not adversely affect other wildlife or beneficial insects, people, or pets. It's applied at a 3 lbs/acre dosage rate.

## 2018 HIGHLIGHTS

- PURCHASE 3 NEW VEHICLES
- APPLY FOR 2018 SCRAP TIRE GRANT
- IMPLEMENT STEM PROGRAM IN LOCAL SCHOOLS
- INCREASE ADULT MOSQUITO TRAPPING
- ON-LINE MAPPING OF TREATMENT SCHEDULE
- ADDITIONAL LAB/FIELD TECHNICIAN
- ENHANCE SAFETY TRAINING PROGRAMS
- NEW TREATMENT POSTING POLICIES IN MICHIGAN
- NEW RINSE WATER TESTING PROCEDURES
- SUBMIT ANNUAL FEDERAL TREATMENT REPORTS
- ATTEND NATIONAL MOSQUITO CONFERENCE

## THE AERIAL PROGRAM

Aerial larviciding of seasonally flooded woodlots signals the beginning of the mosquito control season. Three aircraft are contracted to apply *Bti* to 50,000 acres of flooded woodlot habitat each spring to greatly reduce the spring *Aedes* mosquito population. Historically, treatment begins in mid-April, but commencement is dictated by both weather and larval development. The Biology Department critically monitors larval growth and uses that information to guide the aerial larviciding program.

BAY COUNTY MOSQUITO CONTROL

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## LARVAL MOSQUITO MANAGEMENT

Larviciding, which includes source reduction, involves the introduction of control materials into aquatic habitats to control larvae or pupae and prevent adult emergence. Habitats with a previous history of breeding will be investigated, with additional emphasis on mapping new sites. We expect to survey nearly 20,000 sites, treating about 15%. Emphasis will be given to source reduction in the form of dumping water from containers to eliminate larvae as opposed to using a control material. Technicians will respond to residential service requests as well as survey known breeding sites or new sites found during daily monitoring.

Larviciding is a main program component, comprising about 70% of control efforts. Control materials utilized include the microbial products *Bti*, *Bacillus sphaericus*, and Natular/spinosad, as well as temephos and larvicide oils. Habitats monitored include catch basins, roadside ditches, abandoned pools, flooded fields and woodlots, retention ponds, scrap tires, and containers.

MqTrack™ GPS units will be utilized in our larviciding fleet to monitor vehicle routes and locations.

## TRAINING

Technicians are required to attend a day-long May training session where all aspects of the program are discussed. At least two weeks of hands-on training takes place with a certified trainer. Seasonal employees must pass two written tests administered by the Michigan Department of Agriculture and Rural Development (MDARD) to receive a certified pesticide applicator card. This certification lasts three years. MDARD staff will be present to administer the test.

Additional training will take place in 2018 regarding handling hazardous spills, lifting and back safety, driver safety, etc. through OSHA-compliant safety training DVDs. Additional information will be provided to technicians such as Bay County resident's Frequently Asked Questions. Guest speakers such as MDARD field inspectors will provide insight on regulations governing mosquito control and how to remain compliant.



Kaylin Greyerbiehl and William Mathews-Carter strap on Hudson pressure sprayers and wear hip boots as they head out to control woodlot mosquitoes.

## ADULT MOSQUITO MANAGEMENT

Protecting public health by managing mosquito populations is Mosquito Control's primary goal. Through control, the number of adult mosquitoes is lessened, thereby reducing their annoyance and disease risk. In order to meet that goal, nine ultra low volume (ULV) truck-mounted spray units will be used with treatment occurring from sunset to 2:00 am, provided mosquito populations warrant treatment and that weather conditions are conducive. The ULV machines dispense a small amount of control material that must come in contact with adult mosquitoes in order to effectively control them. Machines are calibrated to ensure the proper dosage is applied according to label recommendations. Droplet size is also measured and adjusted throughout the summer ensuring the spray is as effective as possible.

Focus will continue where there is potential disease risk, as well as in areas where high mosquito numbers, as indicated by traps, are adversely affecting Bay County residents. Recreation areas in the county will also be serviced. Four of the nine ULV machines used will be electric during the 2018 season.

Ten MqTrack™ GPS units, that are fabricated and installed by Velocity Systems of Big Rapids, MI, will track control material application, including rate and volume measurements in adulticiding vehicles.



## CREATING A CULTURE OF SERVICE & TEAM

### STAFFING

Seven full-time and 32 seasonal employees will be working during the 2018 season. Seasonal employees fill the following positions: 1 data entry clerk, 2 biology assistants (+ 1 additional biology/larval technician), 19 larval control technicians, and 9 adult control technicians.

Shifts run from 8am-4:30pm (days) and 8pm-2am (nights), but may be variable. Staff cross-training takes place throughout the summer so technicians can switch shifts as needed to control mosquito populations.



Biologist Mary McCarry explains the various ways to dip for mosquito species during an outdoor demonstration.



## ELEMENTS OF BCMC'S CONTROL PROGRAM

Education	Education
Surveillance	Surveillance
Spring Aerial Larviciding	Spring Aerial Larviciding
Summer Larviciding	Summer Larviciding
Source Reduction	Source Reduction
Adulticiding	Adulticiding

## SERVICE REQUESTS & SPECIAL PROGRAMS

### SERVICE REQUESTS

Bay County citizens call for service when adult mosquito populations rise, when rain creates standing water on properties, or when planning outdoor activities such as picnics, weddings, and graduations. These calls are logged into a database and used as a means to monitor mosquito annoyance. Crews are dispatched to help in each situation. Personally-requested yard treatments will now require a 24-hour lawn posting.

### LONG DRIVEWAY PROGRAM

Homes that sit a distance off the main road that do not receive adequate adult mosquito control may opt into the long driveway program (at the discretion of Mosquito Control). Drives are mapped and sprayed during regular township sweeps.

### MEDICAL NEEDS PROGRAM

This program offers extra service to residents who have a verifiable, doctor-supported medical need that warrants additional mosquito surveillance/control. Often, these are residents who suffer from severe mosquito allergies.

### NO SPRAY PROGRAM

Some residents prefer their property not be treated for mosquitoes. Yellow reflective signs mark property lines as a visual reminder for technicians to "skip" the property. Frequently, residents who opt out of adult mosquito control are still in favor of larval control.